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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/896,877	06/29/2001	Wendell P. Noble	MI22-1757	3354
21567	7590	10/03/2005	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			GURLEY, LYNNE ANN	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/896,877

**Applicant(s)**

NOBLE, WENDELL P.

**Examiner**

Lynne A. Gurley

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 5-9,40-53,55-57 and 59 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-9,40-53,55-57 and 59 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This Office Action is in response to the amendment filed 9/1/05 in response to the advisory action mailed 8/15/05.

Currently, claims 5-9, 40-53, 55-57 and 59 are pending.

#### ***Response to Amendment***

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action in combination with the amendment to the claims, **filed 9/1/05**, after advisory action is persuasive and, therefore, the **finality** of that action is **withdrawn**. The **amendment** to the claims, **filed 9/1/05** after advisory action, **has been considered** and entered. The amendment has overcome the prior art used to reject the claims in the previous final rejection. However, in an updated search, the Examiner has found new prior art and has made a new ground(s) of rejection, which follows.

#### ***Response to Arguments***

2. Applicant's arguments with respect to claims 5-9 and 40-59 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Specification***

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 5-6, 40-49, 55-57 and 59 are rejected under 35 U.S.C. 102(b) as being anticipated by Lu et al. (US 4,983,544, dated 1/8/91).

Lu shows the method as claimed in figures 4, 6 and corresponding text, as forming a diffusion region (source/drain/node 24) in a semiconductive material 10, the diffusion region having an outer surface; forming a conductive line (p-type polysilicon 32) laterally spaced from the semiconductive material and diffusion region (by dielectric 32A), a predominate portion of the conductive line being disposed elevationally below the diffusion region outer surface; interconnecting the conductive line and the diffusion region with electrically conductive material (silicide 14A/140; fig. 6); and wherein an entirety of the conductive line is laterally spaced from the semiconductive material (fig. 4 and 6, 32 is entirely spaced from 10 by the dielectric 32A). The electrically conductive material 140/14A is over both the conductive line (or the conductive node) and the diffusion region. The conductive node (or the conductive line) comprises an uppermost surface, and the conductive line comprises an uppermost surface which is coplanar

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with the uppermost surface of the conductive node (fig. 4 and 6; 32 is coplanar with the substrate surface/node uppermost surface; column 7, lines 54-56). Forming the conductive node comprises forming a source/drain region 24. Both the conductive line and the electrically conductive material are formed from different material and the same material (32 is doped polysilicon and 14A/140 is silicide formed of polysilicon and refractory metal). Insulating material 32A (oxide) is between the conductive line and the conductive node and the semiconductive material. The formation of the electrically conductive material over both the conductive line (or the conductive node) and the diffusion region occurs after completing the forming of the diffusion region.

3. Claims 5-9, 40-49, 51-53 and 56-57 and 59 are rejected under 35 U.S.C. 102(e) as being anticipated by Park et al. (US 5,840,591, dated 11/24/98, filed 11/30/95).

Park shows the method as claimed in figures 5-10 and corresponding text as forming a diffusion region (source/drain/node 126) in a semiconductive material 100, the diffusion region having an outer surface; forming a conductive line (subsequently doped polysilicon bit line 106) laterally spaced from the semiconductive material and diffusion region (by dielectric 102 in trench isolation region), a predominate portion of the conductive line being disposed elevationally below the diffusion region outer surface (fig. 5B); interconnecting the conductive line and the diffusion region with electrically conductive material (subsequently doped polysilicon or other conductive material 130); and wherein an entirety of the conductive line is laterally spaced from the semiconductive material (fig. 5B). The electrically conductive material 130 is over both the conductive line (or the conductive node) and the diffusion region. Forming

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the conductive node comprises forming a source/drain region 126/126'. Both the conductive line and the electrically conductive material are formed from different material and the same material (undoped polysilicon which is subsequently doped). Insulating material 130 (oxide) is between the conductive line and the conductive node and the semiconductive material. The formation of the electrically conductive material over both the conductive line (or the conductive node) and the diffusion region occurs after completing the forming of the diffusion region.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. (US 4,983,544, dated 1/8/91).

Lu shows the method substantially as claimed, and as described in the previous paragraphs.

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Lu lacks anticipation only in not teaching that the forming of the conductive line and the electrically conductive material comprises forming both from refractory metals.

It would have been obvious to one of ordinary skill in the art to have formed the conductive line and the electrically conductive material comprises forming both from refractory metals, in the method of Lu, with the motivation that since the conductive bridge 140/14A is formed of refractory metal silicide, the formation of 32 from a refractory metal would be both reasonable in regards to similar or comparable performance of the device.

7. Claims 50 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US 5,840,591, dated 11/24/98, filed 11/30/95) in view of Lu et al. (US 4,983,544, dated 1/8/91) and further in view of Sung (US 5,753,551, dated 5/19/98, filed 11/25/96).

Park shows the method substantially as claimed, and as described in the previous paragraphs.

Park lacks anticipation only in not teaching that the forming of the conductive line and the electrically conductive material comprises forming both from refractory metals; and, that the outer surface of the diffusion region comprises an uppermost surface, wherein the conductive line comprises an uppermost surface which is coplanar with the uppermost surface of the diffusion region.

Lu teaches a refractory metal silicide interconnect between the diffusion/node region and the conductive line.

Sung teaches that the conductive bitline 6/7 may be made of refractory metal and polysilicon.

It would have been obvious to one of ordinary skill in the art to have formed the conductive line and the electrically conductive material comprising both from refractory metals, in the method of Park, with the motivation that Lu and Sung teach and suggest that conventionally the conductive line and the interconnect are formed of refractory metal, so the formation of both from a refractory metal would be both reasonable in regards to similar or comparable performance of the device.

It would have been obvious to one of ordinary skill in the art to have had the outer surface of the diffusion region comprise an uppermost surface, wherein the conductive line comprises an uppermost surface which is coplanar with the uppermost surface of the diffusion region, in the method of Park with the motivation that both Sung and Lu teach the conductive line to be coplanar with the diffusion region as a matter of design choice.

### ***Double Patenting***

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 7-9 and 51-53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15; claims 1-16; claims 1-18 and

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claims 1-12 of U.S. Patent No. 6,884,687; 6,861,311; 6,403,429 and 6,300,204. Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter is coextensive. The US patents, in teaching the formation of an isolation oxide region, which is partially removed in order to accommodate a conductive line in the partially removed portion, are coextensive with the instant claimed invention so that the entirety of the conductive line is laterally spaced from the semiconductive material, since the conductive line is deposited into the isolation region. The planarization of the conductive line with the diffusion region or node region is an obvious variation.

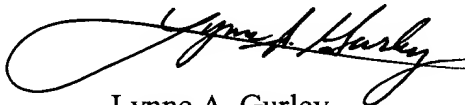
### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See the PTO Form 892 for similar prior art showing fabrication of bitline structures in isolation regions, which are interconnected to diffusion regions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne A. Gurley whose telephone number is 571-272-1670. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lynne A. Gurley  
Primary Patent Examiner  
Art Unit 2812